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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/293,737	04/16/1999	GORDON B. DOW	07844-315001	5291

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MINNEAPOLIS, MN 55402

EXAMINER
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ANYA, CHARLES E

ART UNIT	PAPER NUMBER
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2126

DATE MAILED: 04/08/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No. 09/293,737	Applicant(s) DOW, GORDON B.	
	Examiner Charles E Anya	Art Unit 2126	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9, 11, 13-23, 28, 29, 31-33, 35, 36, 38-40 and 42-57 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11, 13-23, 28, 29, 31-33, 35, 36, 38-40 and 42-57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### DETAILED ACTION

1. Claim 1-9,11,13-23,28,29,31-33,35,36,38-40 and 42-57 are pending in this application.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 19-23,33,40,54-57 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Pat. No. 6,272,672 B1 to Conway.**

4. As to claim 19, Conway teaches a method in computer program for managing dependency among a set of objects, each object of the set having a value, the set including dependent objects, each dependent object having a value that is a function of the values of one or more of the other objects in the set, the method comprising: calculating the dependency among objects in the set dynamically at the time objects calculate their values (figure 6 Col. 21 Ln. 25 – 55).

5. As to claim 20, Conway teaches the method of claim 19, wherein each observed object in the set has one or more accessor methods that each take a requester argument and returns a current value of the observed object, the requester argument identifying the object requesting the value of the observed object (Col. 18 Ln. 41 – 67).

6. As to claim 21, Conway teaches the method of claim 19, wherein each settable object in the set has a value setting method that takes two arguments, namely a transaction argument identifying a transaction with which the change to the settable object's value is registered and a new value for the settable object (Col. 58 Ln. 12 – 46).

7. As to claim 22, Conway teaches the method of claim 19, wherein: each object in the set descends from a value class; each computation operation is represented by a Requester object that is owned by a dependent value object, and the Requester object enters the dependent set of one or more value objects from which the dependent value object depends; and the dependent object uses the Requester object to obtain the object values the dependent object needs to calculate its own value.

8. As to claim 23, Conway teaches the method of claim 22, wherein a Transaction class descends from the Requester class, the method further comprising: accumulating changes to one or more settable Value objects in a Transaction object; and executing the Transaction object (Col. 7 Ln. 41 – 52, Col. 8 Ln. 4 – 35).

9. As to claim 33, see the rejection of claim 19.
10. As to claim 40, see the rejection of claim 19.
11. As to claim 54, see the rejection of claim 20.
12. As to claims 55 and 56, see the rejection of claim 22.
13. As to claim 57, see the rejection of claim 23.

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. **Claims 1,2,5-7,9,28,29,35,36,42,45,46 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,469,538 to Razdow in view of U.S. Pat. No. 5,404,428 to Wu.**

16. As to claim 1, Razdow teaches a method in a computer program for maintaining dependencies among a set of objects each having a value, the set of objects including

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an object A and an object B, the method for maintaining dependencies comprising (Numerical dependency graph 16 Col. 8 Ln. 9 – 43): when the value of object A is a function of the value of object B and the value of object B changes (figure 3A/B Col. 8 Ln. 21 – 43, Col. 11 Ln. 43 – 67, Col. 12 Ln. 1 – 41), marking object A as dirty and not recomputing the value of object A until object A is queried for a value, when the value of object B changes, invalidating the dependents of object B and all of their further dependents (“...out of date...” Col. 9 Ln. 8 – 26).

17. Razdow is silent with reference to severing dependencies among, the dependents of object B and all of their further dependents and causing each invalidated observer-only object to recompute its value by querying the values of the objects from which the observer-only object depends.

18. Wu teaches severing dependencies among, the dependents of object B and all of their further dependents and causing each invalidated observer-only object to recompute its value by querying the values of the objects from which the observer-only object depends (Col. 9 Ln. 1 – 47).

19. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wu and Razdow because the teaching of Wu would improve the system of Razdow by optimizing evaluation traversal (Col. 9 Ln. 42 – 47).

20. As to claim 2, Razdow teaches the method of claim 1, further comprising: providing object B in the construction of object A, wherein the value of object A is a

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function of the value of the object B that was provided in the construction of object A (figure 3A/B Col. 8 Ln. 21 – 43, Col. 11 Ln. 43 – 67, Col. 12 Ln. 1 – 41).

21. As to claim 5, Wu teaches the method of claim 1, further comprising: when an object is marked as dirty, breaking any dependency relationships the marked object may have had; and when the value of an object is recomputed, identifying the objects on which the recomputed value is actually dependent and identifying the recomputed object as dependent only on the identified objects (Col. 9 Ln. 1 – 47).

22. As to claim 6, Razdow teaches the method of claim 1, wherein the set of objects includes settable objects and dependent objects, and each dependent object maintains a flag whose setting marks the dependent object as valid or invalid (i.e., dirty) (Col. 9 Ln. 8 – 15).

23. As to claim 7, Razdow teaches a method in a computer program for maintaining dependencies among a set of objects each having a value, the method for maintaining dependencies comprising (Numerical dependency graph 16 Col. 8 Ln. 9 – 43): identifying the objects upon which a given object depends as those objects into which the given object passed itself as a requester during execution of a compute method of the given object (Col. 8 Ln. 21 – 43, Col. 11 Ln. 39 – 61), and marking the given object as dirty whenever the value of any one of the identified objects changes.

24. Radow is silent with reference to not recomputing the value of the given object until the given object is queried for a value.
25. Wu teaches not recomputing the value of the given object until the given object is queried for a value Col. 9 Ln. 1 – 47).
26. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wu and Razdow because the teaching of Wu would improve the system of Razdow by optimizing evaluation traversal (Col. 9 Ln. 42 – 47).
27. As to claim 9, see the rejection of claim 6.
28. As to claims 28 and 35, see the rejection of claim 1.
29. As to claims 29 and 36, see the rejection of claim 7.
30. As to claims 42 and 45, see the rejection of claims 2 and 5 respectively.
31. As to claims 46 and 48, see the rejection of claim 6.



**32. Claims 11,13-18,31,32,38,39,49 and 50-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,272,672 B1 to Conway in view of U.S. Pat. No. 5,404,428 to Wu.**

33. As to claim 11, Conway teaches a method for changing objects having values defining state of a computer program application, comprising: receiving a change to a value of a changed object, the changed object being a settable object in the compute program application (Section 6.1 Col. 57 Ln. 52 – 67), registering the change with a transaction, dirtying all objects dependent (directly or indirectly) on the changed object (Col. 17 Ln. 48 – 67, Col. 18 Ln. 1 – 31, Col. 58 Ln. 12 – 67), severing dependencies from the changed object and all of its direct and indirect dependent objects.

34. Conway is silent with reference to whenever a leaf object is encountered as a dependent object, enqueueing the leaf object for synchronization after the transaction is committed.

35. Wu teaches whenever a leaf object is encountered as a dependent object, enqueueing the leaf object for synchronization after the transaction is committed (Col. 9 Ln. 1 – 41).

36. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Wu and Conway because the teaching of Wu would improve the system of Conway by optimizing evaluation traversal (Col. 9 Ln. 42 – 47).

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37. As to claim 13, Conway teaches the method of claim 11, wherein leaf object synchronization comprises: recomputing a value for each objects marked as dirty, identifying the objects on which the recomputed value is actually dependent, and identifying the recomputed object as dependent only on the identified objects (Col. 18 Ln. 63 – 67).

38. As to claim 14, Conway teaches the method of claim 13, further comprising: using a requester object to make the transaction consistent, the requester object operating to request an object's value so that the requested value cannot change until the requester terminates, at which time all objects whose values were requested by the requester object are released (Col. 21 Ln. 10 – 19).

39. As to claim 15, see the rejection of claims 11 and 13.

40. As to claim 16, Conway teaches the method of claim 15, wherein: the dependency graph represents application state; the roots of the dependency graph are the settable objects of the application state and the intermediate nodes of the dependency graph are dependent objects whose values are the results of intermediate computations (Col. 15 Ln. 46 – 67, Col. 18 Ln. 63 – 67).

41. As to claim 17, Conway teaches the method of claim 15, wherein: the leaf objects of the dependency graph are coupled to a user interface (figure 85 Col. 59 Ln. 44 – 56).

42. As to claim 18, see the rejection of claim 17.

43. As to claim 31, see the rejection of claim 11.

44. As to claim 32, see the rejection of claim 15.

45. As to claim 38, see the rejection of claim 11.

46. As to claim 39, see the rejection of claim 15.

47. As to claim 49, see the rejection of claim 13.

48. As to claim 50, see the rejection of claim 14.

49. As to claim 51, see the rejection of claim 16.

50. As to claims 52 and 53, see the rejection of claim 17.

**51. Claims 3,4,8,43,44 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 5,469,538 to Razdow in view of U.S. Pat. No.**

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**5,404,428 to Wu as applied to claim 1 above, and further in view of U.S. Pat. No. 6,272,672 B1 to Conway.**

52. As to claim 3, Razdow as modified is silent with reference to the method of claim 1, further comprising: providing in object B a handleRequest method that adds a requester owned by object A to a dependents list for object B, the dependents list identifying all objects whose value is a function of the value of object B.

53. Conway teaches to the method of claim 1, further comprising: providing in object B a handleRequest method that adds a requester owned by object A to a dependents list for object B, the dependents list identifying all objects whose value is a function of the value of object B (figure 6 Col. 21 Ln. 25 – 55).

54. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Conway and Razdow because the teaching of Conway would improve the system of Razdow by providing a means of identifying components to be notified of change (Col. 21 Ln. 25 – 55).

55. As to claim 4, Razdow teaches the method of claim 3, wherein the dependents lists for all objects in the set collectively define a directed, acyclic dependency graph (Col. 8 Ln. 9 – 20).

56. As to claim 8, Razdow as modified is silent with reference to the method of claim 7, further comprising: identifying as dependents of a root object all objects that passed

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themselves as requester objects to the root object or to a dependent of the root object during execution of the requester objects respective compute methods, whereby the set of dependents of the root object is a set that changes based on the computation of dependents and not the root object itself.

57. Conway teaches the method of claim 7, further comprising: identifying as dependents of a root object all objects that passed themselves as requester objects to the root object or to a dependent of the root object during execution of the requester objects respective compute methods, whereby the set of dependents of the root object is a set that changes based on the computation of dependents and not the root object itself (figure 6 Col. 21 Ln. 25 – 55).

58. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings of Conway and Razdow because the teaching of Conway would improve the system of Razdow by providing a means of identifying components to be notified of change (Col. 21 Ln. 25 – 55).

59. As to claim 43, see the rejection of claim 3.

60. As to claim 44, see the rejection of claim 4.

61. As to claim 47, see the rejection of claim of 8.

***Response to Arguments***

62. Applicant's arguments with respect to claims 1-9,11,13-23,28,29,31-33,35,36,38-40 and 42-57 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

63. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 6,292,804 B1 to Ardoin et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E Anya whose telephone number is (703) 305-3411. The examiner can normally be reached on M-F (8:30-6:00) First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, An Meng-Ai can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles E Anya

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A handwritten signature in black ink, appearing to read 'Meng-Al T. An', with a long horizontal flourish extending to the right.

MENG-AL T. AN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100